Chapter 1
How We Learn at the Digital Workplace

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Abstract Research on learning at the workplace significantly grew over the past few years. A trending theme within research on learning at the workplace is an emphasis on digital learning. Digital learning is defined as any set of technology-based methods that can be applied to support learning processes. For corporate organisations, digital technologies enable the implementation of customised learning environments even on small scale. Access to digital technologies changes learning at the workplace through cost-effective delivery modes, easy to access leaning resources, and flexible learning environments. Still, research in digital workplace learning and how digital technologies can bridge formal and informal learning at the workplace is scarce. Therefore, this edited volume *Digital Workplace Learning* aims to provide insight into how digital technologies may bridge and enhance formal and informal workplace learning.

1.1 Introduction

Lifelong learning is the continuous, voluntary, and self-motivated pursuit of knowledge for personal or professional reasons (Fischer, 2000). A significant finding produced through the scientific discourse on lifelong learning is that learning is not only focussed on learning at school and applying that knowledge at the workplace. In this regard, lifelong learning can take the form of formal, non-formal, or informal learning and is embedded in our daily lives. Hence, this perspective places interest of researchers on learning at the workplace.

Research on learning at the workplace significantly grew over the past few years (Malloch, Cairns, Evans, & O'Connor, 2011). Work-based learning is regarded as an opportunity for developing workplace competencies and promoting productivity of personnel. Other conceptualisations include learning *about* work, learning *through* work, and learning *at* work (Malloch et al., 2011). Over the past 20 years, the research community grew rapidly and produced thousands of studies focussing on issues about learning at the workplace. Significant contributions focussing on

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lifelong learning and workplaces emerged in the United States (Marsick & Watkins, 1990), Australia, and the United Kingdom (Billett, 2002; Boud & Solomon, 2001), as well as in continental Europe (Achtenhagen & Beck, 1997; Billett, Harteis, & Gruber, 2014).

One trending theme within research on learning at the workplace is an emphasis on digital learning. Digital learning is defined as any set of technology-based methods that can be applied to support learning processes (Ifenthaler, 2010). Emerging opportunities for digital learning include game-based learning (Ifenthaler, Eseryel, & Ge, 2012), simulations (Ifenthaler, 2012a), massive open online courses (Ifenthaler & Schumacher, 2016b), social networks (Ifenthaler & Pirnay-Dummer, 2011), learning analytics (Ifenthaler, 2017a, 2017b; Ifenthaler & Widanapathirana, 2014), or mobile and augmented applications (Ifenthaler & Eseryel, 2013; Sampson, Isaias, Ifenthaler, & Spector, 2013). For corporate organisations, digital technologies enable the implementation of customised learning environments even on small scale. Access to digital technologies changes learning in the workplace through cost-effective delivery modes, easy to access leaning resources, and flexible learning environments. Currently, digital workplace learning is mostly implemented as formal learning environments, for example, in the form of Corporate Open Online Courses (COOCs). However, the opportunity for digital technology in workplace learning is the support of informal learning and fostering enablers for lifelong learning (Egloffstein & Ifenthaler, 2017).

Still, research in digital workplace learning and how digital technologies can bridge formal and informal learning at the workplace is scarce. Therefore, this edited volume *Digital Workplace Learning* aims to provide insight into how digital technologies may bridge and enhance formal and informal workplace learning. The first section of this edited volume explores theoretical issues of digital workplace learning. Sect. 1.2 focusses on advances in design, implementation, and assessment in digital workplace learning. The third section presents case studies and innovative approaches in digital workplace learning.

1.2 Theory of Digital Workplace Learning

The first section of the edited volume includes theoretical perspectives on digital workplace learning. Versatile research has been conducted in the field of learning and instruction which motivated instructional designers to redefine the principles of learning and teaching (Ifenthaler, 2012b). Clearly, the days of preprogrammed learning environments are numbered in which the learner – as in the classical paradigm of programmed instruction – is viewed more as an audience than as an active constructor. Learners at the digital workplace are the constructors of their own learning environments and create as well as share the artefacts of learning (Ifenthaler & Schumacher, 2016a). Digital technologies assist and facilitate the learner or a group of learners during the learning process whenever needed (Ifenthaler, 2015).

Chapter 2 titled *Encouraging Metacognition in Digital Learning Environments* focusses on the theory of metacognition, empirical evidence regarding how to increase learning, and examples of how it can be incorporated into digital workplace settings (*Christopher J. Devers, Erin E. Devers, Lorne D. Oke*). The authors focus on 13 principles of multimedia learning for designing digital learning environments and highlight learning techniques such as practice testing, distributed practice, interleaved practice, self-explanation, and elaborative interrogation. As a result, increased metacognition, learning, and engagement are expected.

A New Work and Learn Framework by Hope Clark, Parminder K. Jassal, Michelle Van Noy, and Pamela L. Paek (Chap. 3) summarises the evolution of knowledge economy to a new learning economy, driven by new technological forces, digital signals, and the rise of the working learner. The authors argue that the emergence of a new learning ecosystem reflects the integration of working, learning, and living supported by innovative tools and technology. The rapid changes result in a paradigm shift from valuing what one knows toward how an individual leverages technology to apply what is learned.

Chapter 4 by Clara Schumacher focusses on *Supporting Informal Workplace Learning Through Analytics.* The chapter describes how analytics approaches can be applied to the context of informal workplace learning. A future scenario of informal workplace learning is illustrated which highlights the support of learning through analytics framed as workplace learning analytics.

1.3 Design, Implementation, and Assessment for Digital Workplace Learning

The design of learning environments will always change in alignment with changes of educational goals. Hence, the design of learning environments in the 1800s or 1900s was extremely different to the twenty-first century design of learning environments for the digital workplace (Ifenthaler, 2012b). Still, the design of learning environments for the digital workplace includes three simple questions: What shall be learned? How shall it be learned? How is learning supported?

Chapter 5 titled *Designing Competence Assessment in VET for a Digital Future* provides an overview of the design, implementation, and evaluation of a technology-based assessment measuring trainee competencies in the field of economics (Julia Sangmeister, Esther Winther, Viola Deutscher, Sandra Bley, Christine Kreuzer, and Susanne Weber). The authors document a growing need for appropriate assessment to be aligned with curriculum and instruction in digital workplace learning. A workplace simulation helps to bridge the gap between work reality and assessment through visualising work and business processes in an industrial enterprise in which test takers act and make decisions in computer-based tasks.

Designing Flipped Learning for Digital Workplace Learning by Firat Sarsar and Yusuf Yılmaz (Chap. 6) provides an overview of flipped learning and its four pillars

that can be used in digital workplace learning. The authors argue that flipped learning supported by digital workplace learning aims to provide achievable learning by flexible, easy to access training without any kind of restriction on time or location.

Chapter 7 by Lisa A. Giacumo, Steven W. Villachica, and Jeroen Breman asks *Workplace Learning, Big Data, and Organizational Readiness: Where to Start?* Clearly, there is a growing need for professionals being able to analyse data to inform business decisions. The authors describe an emerging model of big data readiness in organisations and its implications for determining readiness including recommendations for future research in big data readiness of organisations.

Combining Learning Analytics with Job Market Intelligence to Support Learning at the Workplace by Alan Mark Berg, Jiri Branka, and Gábor Kismihók (Chap. 8) reviews how to combine big data infrastructures to provide optimised and just-in-time advice to learners. Using machine learning algorithms, millions of job descriptions are analysed to help to identify the skill level of a learner which are most appropriate for local and temporal workplace demands.

Marc Egloffstein discusses MOOCs as a method for digital workplace learning in *Massive Open Online Courses in Digital Workplace Learning* (Chap. 9). The chapter highlights basic MOOC designs and platform features as well as provides an overview on current MOOC providers for digital workplace learning.

Chapter 10 titled *Creatıng a MOOC Portal for Workplace Learning* focusses on a European Union funded project which aimed to implement a MOOC service in Turkey for promoting adaptability of employees and employers with regard to changing social and economic structures (Sezin Eşfer and Kursat Cagiltay).

Markus Schäfer and Eckart Diezemann introduce a teaching concept using a design-based and product-oriented digital learning environment for vocational trainees in car mechatronics fitters. Chapter 11 titled *kfz4me.de – Design-based Learning Settings for Vocational Education and Training* highlights the design-based concept, illustrates the sequence of actions, carves out practice-oriented elements, and reflects critically at the intended learning outcomes.

1.4 Case Studies and Innovative Approaches

The final section of this edited volume presents current research and practical innovations in digital workplace learning. The chapters tackle important issues in educational research and provide rich insights into practice-based projects.

Can Learning Analytics find Success in Didactical Measurements? Results from a MOOC Case Study by Mohammad Khalil and Martin Ebner (Chap. 12) presents an analysis of a MOOC at Graz University of Technology. The focus of the quantitative investigation is on learners' traces in videos, discussion forums, and quizzes. In addition, the chapter highlights the design approach of the MOOC called Dr. Internet.

Chapter 13 titled *Digitalisation of Work: Between Affordances and Constraints for Learning at Work* investigates the impact of digital technologies on workplace

learning in administrative work (Christoph Fischer, Michael Goller, Lorraine Brinkmann, and Christian Harteis). The authors report findings into how certain workplace characteristics change due to digital technologies as well as highlight critical issues arising from digital technologies at the workplace.

Alberto A. P. Cattaneo and Carmela Aprea show how digital technologies in general and visual technologies in particular can help to bridge the gap between school-based and a work-based learning environments. Chapter 14 titled *Visual Technologies to Bridge the Gap between School and Workplace in Vocational Education* outlines a VET-specific pedagogical model which views technologies as boundary objects that could support teaching, learning, and communication across the sites. The approach is exemplified in VET such as chefs, butchers, and scrub nurses.

Learning Factories in Vocational Schools by Ralf Scheid describes the implementation of learning factories in schools including challenges associated with this alternative form of vocational education (Chap. 15). The chapter presents concepts and developments for supporting learning factories in vocational schools.

Chapter 16 titled *Online Onboarding: Library Workplace Training in a Trilingual Interactive Online Asynchronous Environment* describes an academic library's experiences in training two international student workers and one librarian to design online onboarding training modules for student workers (Russell Michalak and Monica D.T. Rysavy). The authors provide insights into the pre- and post-module training as well as design plans for future iterations of the training.

The final chapter by Angela Elkordy and Nicole Zumpano titled *Hive-minded: Educators, Professional Learning Networks and Knowledge Exchange in the Digital Age* explores how, why, and when educators in K-20 contexts connect through digital knowledge networks (Chap. 17). The authors look at the way in which educators use social media for knowledge co-creation and sharing through digitally facilitated communities to inform practice.

1.5 Conclusion

Digital workplace learning calls for a reconsideration of the design of learning environments, with a special focus on learning technologies (Noe, Clarke, & Klein, 2014). Hence, the use of digital technology in workplace learning can provide a plethora of solutions to support work and work-related learning activities (Littlejohn & Margaryan, 2014). Current themes in digital workplace learning include big data for learning, learning and workplace analytics, people analytics, as well as bridging formal learning and informal learning through digital technologies. Many of these themes are present in this volume. However, robust empirical evidence is required in order to better support learning at the digital workplace.

References

Achtenhagen, F., & Beck, K. (1997). Welchen Standards sollte eine Ausbildung von Berufsschulleh-rern genügen? *Zeitschrift für Berufs- und Wirtschaftspädagogik*, *93*, 535–538.

Billett, S. (2002). Workplace pedagogic practices: Co-participation and learning. *British Journal of Educational Studies*, *50*(4), 457–481.

Billett, S., Harteis, C., & Gruber, H. (Eds.). (2014). *International handbook of research in professional and practice-based learning*. Dordrecht: Springer.

Boud, D., & Solomon, N. (Eds.). (2001). *Work-based learning: A new higher education?* London: McGraw-Hill Education.

Egloffstein, M., & Ifenthaler, D. (2017). Employee perspectives on MOOCs for workplace learning. *TechTrends*, *61*(1), 65–70. https://doi.org/10.1007/s11528-016-0127-3

Fischer, G. (2000). Lifelong learning - more than training. *Journal of Interactive Learning Research*, *11*(3/4), 265–294.

Ifenthaler, D. (2010). Learning and instruction in the digital age. In J. M. Spector, D. Ifenthaler, P. Isaías, Kinshuk, & D. G. Sampson (Eds.), *Learning and instruction in the digital age: Making a difference through cognitive approaches, technology-facilitated collaboration and assessment, and personalized communications* (pp. 3–10). New York, NY: Springer.

Ifenthaler, D. (2012a). Computer simulation model. In N. M. Seel (Ed.), *Encyclopedia of the sciences of learning* (Vol. 3, pp. 710–713). New York: Springer.

Ifenthaler, D. (2012b). Design of learning environments. In N. M. Seel (Ed.), *Encyclopedia of the sciences of learning* (Vol. 4, pp. 929–931). New York: Springer.

Ifenthaler, D. (2015). Learning analytics. In J. M. Spector (Ed.), *The SAGE encyclopedia of educational technology* (Vol. 2, pp. 447–451). Thousand Oaks, CA: Sage.

Ifenthaler, D. (2017a). Are higher education institutions prepared for learning analytics? *TechTrends*, *61*(4), 366–371. https://doi.org/10.1007/s11528-016-0154-0

Ifenthaler, D. (2017b). Learning analytics. In K. Peppler (Ed.), *The SAGE encyclopedia of out-of-school learning* (pp. 417–420). Thousand Oaks, CA: SAGE Publications.

Ifenthaler, D., & Eseryel, D. (2013). Facilitating complex learning by mobile augmented reality learning environments. In R. Huang, Kinshuk, & J. M. Spector (Eds.), *Reshaping learning: The frontiers of learning technologies in a global context* (pp. 415–438). New York, NY: Springer.

Ifenthaler, D., Eseryel, D., & Ge, X. (2012). Assessment for game-based learning. In D. Ifenthaler, D. Eseryel, & X. Ge (Eds.), *Assessment in game-based learning. Foundations, innovations, and perspectives* (pp. 3–10). New York, NY: Springer.

Ifenthaler, D., & Pirnay-Dummer, P. (2011). States and processes of learning communities. Engaging students in meaningful reflection and elaboration. In B. White, I. King, & P. Tsang (Eds.), *Social media tools and platforms in learning environments: Present and future* (pp. 81–94). New York, NY: Springer.

Ifenthaler, D., & Schumacher, C. (2016a). Connectivism. In S. Danver (Ed.), *The SAGE encyclopedia of online education* (pp. 409–411). Thousand Oaks, CA: Sage.

Ifenthaler, D., & Schumacher, C. (2016b). Udacity. In S. Danver (Ed.), *The SAGE encyclopedia of online education* (pp. 1149–1151). Thousand Oaks, CA: Sage.

Ifenthaler, D., & Widanapathirana, C. (2014). Development and validation of a learning analytics framework: Two case studies using support vector machines. *Technology, Knowledge and Learning*, *19*(1–2), 221–240. https://doi.org/10.1007/s10758-014-9226-4

Littlejohn, A., & Margaryan, A. (2014). Technology-enhanced professional learning. In S. Billett, C. Harteis, & H. Gruber (Eds.), *International handbook of research in professional and practice-based learning* (pp. 1187–1212). Dordrecht, The Netherlands: Springer.

Malloch, M., Cairns, L., Evans, K., & O'Connor, B. (Eds.). (2011). *The SAGE handbook of workplace learning*. Thousand Oaks, CA: Sage.

Marsick, V. J., & Watkins, K. E. (1990). *Informal and incidential learning at the workplace*. London, UK: Routledge.

Noe, R. A., Clarke, A. D. M., & Klein, H. J. (2014). Learning in the twenty-first-century workplace. *Annual Review of Organizational Psychology and Organizational Behavior*, *1*, 245–275.

Sampson, D. G., Isaias, P., Ifenthaler, D., & Spector, J. M. (Eds.). (2013). *Ubiquitous and mobile learning in the digital age*. New York, NY: Springer.